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This rule is still in force and the whole organization lives it to the letter. Hunt Engineers will help plan a coal, coke and ashes handling system that will lessen labor, increase efficiency, save time and reduce the cost of this essential operation.

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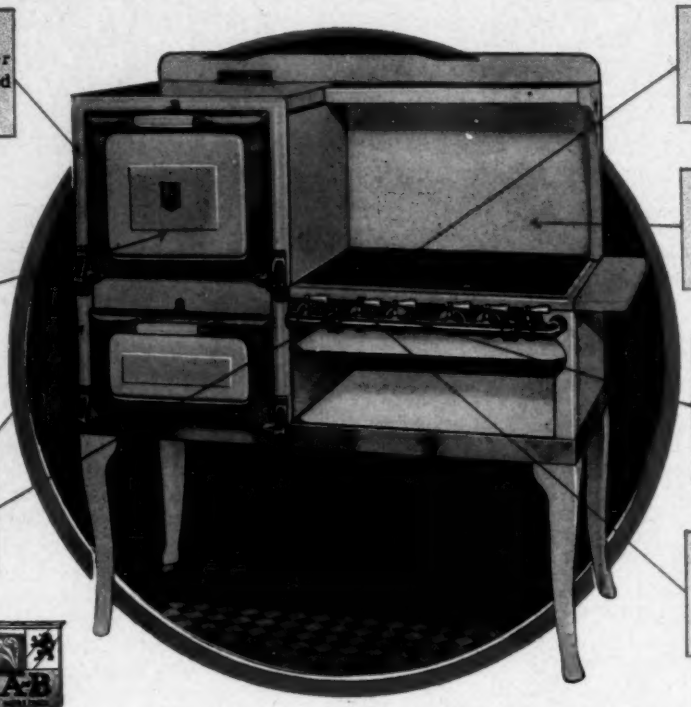

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A. G. A. Specifications

Baking Oven Bottoms

When made of sheet steel and insulated, the bottom of baking oven is to be double and the insulation is not to be exposed, and is to be so placed that it will not shift. The sheet metal to be used in the upper part of the oven bottom to be not less than No. 22 gauge.

Sheet Iron

No parts made of sheet iron to be less than No. 24 gauge, except rack supports and top back strip. Heavier metal should be used where specified.

Burners

Burners to be cored castings and not to have loose parts. The gas outlets to be drilled parts. No cone spreaders to be used. Top burners not to be bolted to their supports. The distance between the tops of burners and the bottom of a vessel placed on the top grates to be not less than 1¾ inches, nor more than 1¾ inches.

Manifolds and Cocks

The entire manifold to be tight and free from leaks when subjected to a pressure of 3 pounds per square inch. Gas cocks to be standard.

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Air mixers on top and oven burners to have flat faces, smoothly finished, so as to prevent leakage of air, and fitted with flat-faced close-fitting shutters to be attached by ⅛ inch stove bolts.

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AMERICAN
GAS JOURNAL

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How to Be a Success in the Gas Business

Being a helpful talk to employees who are anxious to get along in their chosen profession

G. W. Allen, Toronto, Canada

Secretary, Canadian Gas Association

IN A *previous article the writer pointed out some reasons why so many men fail to make good in the gas industry.

In this article there will be described a few of the ways and means which, if put into practice, will greatly aid any honest, ambitious employee in his efforts to be successful in any department of a gas company.

Success means more than mere "getting on," or holding down a steady position. It means more than an occasional raise in pay, and even more than the hope that some day there may be a pension because of long service in the industry.

What Constitutes Success

To the writer success means steady, consistent promotion from a position of more or less obscurity, of more or less humility, to one of prominence and respect. It is that steady advance in the employ of one's company—the result of having given efficient, reliable, sincere and faithful service. And all to the end of bringing satisfaction and profit to both the company and the company's customers. No business ever succeeded unless both parties to the contract were benefited.

The gas business has many thousands of steady, honest and reliable workers, but there is no use disputing the fact that there are but very few who are honestly making an endeavor to study all they can about the possibilities of the industry so as to fit themselves for assuming greater responsibilities.

Keeping Well Informed

In my own course of travels it has been my pleasure to meet with many successful gas men, and as a rule to find them constant readers of all the literature they can get hold of applying to their own immediate work. Many of these men place great faith in their favorite gas journals and rarely miss any of the good things contained in them that might be of assistance to them in their employment.

You have all, no doubt, heard of the railroad president who, passing one day through the station, noticed a man tapping the car wheels, and said to him, "Well, my man, how long have you been at that work?"

Worker: "About twenty years."

President: "And what do you tap the car wheels for?"

Worker: "Blamed if I know."

Know Your Task

This is without doubt an exaggerated case of lack of knowledge of one's work, but are there not many workers in industry who know very little about their daily tasks, let alone about their surroundings? On the other hand, they will grumble or become discontented because they are never considered for promotion.

Ralph Parlette, the well-known writer of inspirational literature, once said he was one day in a paper mill standing beside a long machine making shiny, supercalendered paper. A man came along with an oil can, squirting oil into the squirt places along the side of the machine. Mr. Parlette asked the man questions about the machine and he answered fairly well. Having a nose for news, Parlette asked him a few more questions about the process over in the next room. He replied, "I don't know nothing about it, boss, I never worked there." He asked him about another process. "I don't know nothing about it, I never worked there." He asked him about the pulp mill. "I don't know nothing about it, I never worked there."

*See American Gas Journal, December 8, 1922.

It has been well said, "If you do not put anything into your work, it is a sure thing you will not get anything out of it." This applies to every one of us, no matter on what work we may be engaged. It applies to all employees in the gas industry. If we have no faith in it, if we take no interest in its possibilities, if we go about from day to day doing as little as we can possibly do for it, it is a certainty we will not get anything out of it.

Doing Your Duty Does Not Merit Promotion

Some years ago an employee of a large gas company where I was employed came to me and asked for information as to why he had not been promoted to a certain position which had gone to another man. The employee asking the question was just one of the great average of workingmen today—good, steady, honest, all-around men—plodders, many of whom do all that is required of them, but somehow or other fail to make progress in any definite direction.

When asked why he considered he should have been promoted, the man replied: "I have been with the company a number of years, have always endeavored to do my work well, have seldom been away from work," etc. He seemed quite surprised when told he had done just what he was paid to do, just what we considered was required of him, and that it was not customary to pay men more wages, or to promote them, just because they did what they were instructed to do.

Employers Look for Men Who Do More Than Required

Under our present competitive business system, employers are looking for men who do more than is required of them, or who give the best that is in them. It is such employees that get rewarded in time and who are promoted. Our competitive system makes for greater efficiency in service, and this is one of the qualifications required of men and women in business today. The fit advance and the unfit decline. It is, therefore, essential that all employees fit themselves for their work. It is necessary that all products be produced at the lowest possible cost, and in order to do this companies are looking for efficient workers. When they find such workers, employers usually try to hold on to them. This makes it very important that men selected for positions of responsibility be men of exceptional character. Business men everywhere, particularly now in the gas business, are looking for men of this stamp. The great growth of the gas industry within recent years, almost in spite of itself, has forced managers into that position where it becomes imperative that only good workers be employed to assist in taking care of the developments taking place.

A Catechism for the Gas Man

Now some of the questions we would like to ask the ambitious employee would be very much along the following lines:

1. Have you faith in the gas industry?
2. Do you believe the gas industry offers opportunities to young, ambitious men?
3. Do you feel that any time and effort you might give towards developing the industry would be time and effort well spent, or do you feel it would be wasted effort?
4. Do you feel that any effort you put forth to improve your every-day work will go unrewarded?
5. Do you feel that your manager, or superintendent, shows favoritism towards others, and that you would never have an opportunity?
6. Do you feel that because other employees have had longer service records your chance of promotion is very slim?

The Answers

If you answer "No" to questions 1 and 2 and the first part of question 3, then my advice to you would be to get out of the gas business altogether. The same applies if the answer "Yes" is given to questions 4, 5 and 6, and the latter part of question 3.

To say "No" to questions 1 and 2 and the first part of 3 would immediately show that such an employee is lacking in foresight and knowledge of the true position that the gas industry now holds in the world of business. An employee of that kind would never make a success in the business, because faith in its future is an essential qualification.

The man who would answer "Yes" to the latter part of question 3, and the same to 4, 5 and 6, is one who would not at any time put forth the best that is in him. He would always be doubting the value of every effort the company put forth to help its men. There have been managers in the service of various companies who have shown favoritism to certain employees, but such managers are in the minority. I have seen managers act as if they were showing favoritism, but who, on further investigation, were found only to have been selecting certain men who in their judgment seemed most ably to fill the requirements of the positions in which they were placed.

Some Good Advice

Good advice to any man in the gas business, particularly those who are desirous of advancement, but do not know how to go about it, is to say to them, go, look in a mirror and there, face to face with yourself, ask these questions:

"Say, Bill, are you really honest with yourself?"

(Continued on page 772)

Coal-Coke Mixture for Generator Fuel

Details of large scale operations with the mixed fuel

J. M. Williamson

Chemist, Citizens Gas and Electric Company, Waterloo, Iowa

BECAUSE of the extremely high cost of a good grade of gas-making coke and the relatively low price of bituminous coal, a great deal of experimental work has been done on the substitution of coal for coke as generator fuel in the gas industry.

This paper has to do with the operation and results obtained by using a coal-coke mixture as generator fuel in the plant of the Citizens Gas and Electric Company at Waterloo, Iowa. A coal-coke mixture varying from 50 per cent to 80 per cent coal has been used at this plant continuously since July, 1923, and very satisfactory results have been obtained at all times.

Results Obtained

The results obtained by using this method of operation, and a 65 per cent mixture of a good grade of coal, are:

Fuel.....32.0 lbs.
Oil..... 3.0 gals.
Steam.....33.0 lbs. per 1,000 cu. ft. of gas made

This compares quite favorably with the first six months of 1923, when straight coke was used and the following results obtained:

Fuel.....31.4 lbs.
Oil..... 3.15 gals.
Steam.....36.0 lbs. per 1,000 cu. ft. of gas made

This is a saving of 25 per cent on fuel costs with very little increase in other operating expenses, due to using coal instead of coke.

Plant Equipment and Operating Conditions

The equipment at the plant consists of two 8 ft. 6 in. carburetted water gas sets, with air and steam flow meters, pyrometers and column water gauges.

The operating conditions are as follows:

A run-time of from ten to fourteen hours is required to produce the daily average of 1,000,000 cu. ft. of gas. This time is divided into two shifts with a three-hour shut-down in the afternoon and a four-hour shut-down at night, with all the clinkering done at the beginning and end of the day shift, and barring down only on the morning clinker. A seven-minute cycle is used, 2¾ minute blast and 4¼ minute run with a 10 second air purge at the beginning and a 15 second air purge at the end of the run. Split runs—1 minute up steam, 2 minutes down steam, 50 seconds up steam—are used, and one buggy of fuel is fired every fourth or fifth run.

Variation in Conditions Effected by Coal

It is harder to bring the generator up to temperature on coal than coke, requiring a much longer blast, which is hard on both generator and stack. To avoid this as much as possible, the morning fill-up consists of four buggies of 900 lbs. each straight coke and three buggies of mixed fuel consisting of 1,050 lbs. coal and 300 lbs. coke. Dry runs, or regular runs without any oil, are used to bring the set up to temperature. By this means the set is brought up to temperature more quickly than by straight blasting and without the ill effects on the generator and stack. At first, three of these dry runs were necessary, but as the operators became more experienced it was found that the carburetter could be lighted after the first run by proper manipulation of the air valve. The analysis of this dry run gas showed 40 per cent nitrogen and a heat value of only 160 B.t.u., but as only a small volume of it is made, it does not appreciably affect the heat value of the holder gas.

Advantages of Blow Run Method

The value of the blow run method of operation by using an air purge has been proved conclusively at this plant. By this means the make per run is increased 20 per cent, and the coal-coke fuel lowered correspondingly, with only a slight increase in the oil necessary to hold up the B.t.u. value. In order to bring the generator up to temperature during the blast, more coal gas is made than can be used in the carburetter and superheater; consequently, this gas is wasted unless the air purges are used. It was found that the best results were obtained when using two air purges, one at the beginning and the other, a longer one, at the end of the run. The length of these purges was determined by the nitrogen content in the analysis of the made gas. Ten per cent nitrogen was the figure determined upon at which the best efficiencies were obtained.

Variation of Air Used in Blast

The amount of primary air to the generator during the blast is much less when using a coal-coke mixture than when using straight coke, and the secondary air is correspondingly increased. This is due to the fact that on straight coke very little coal gas is produced during the blast, and so only the specific heat of the blast gases can be used in heating the

carburetter and superheater. When coal is used, a large quantity of coal gas is produced during the blast which is not all burned in the generator, due to the lack of sufficient primary air. This passes into the carburetter, where combustion takes place if there is sufficient secondary air; if not, it passes through and is wasted by burning at the stack. Good blast conditions are being maintained when the blast gases show the following analysis: First 10 seconds of blast, 16 per cent carbon dioxide and 1 per cent monoxide, the dioxide decreasing to 13 per cent at the end of the blast, and the monoxide increasing to 4 per cent.

Fuel efficiencies, when using a coal-coke mixture, seem to vary directly with the physical properties of the coal, while the clinkering difficulties are directly dependent upon the percentage of ash in the coal. Of the ten kinds of Illinois, Indiana and Kentucky coals used, the following are typical of the conditions experienced:

Use of Hard Nut Coal

The best results have been obtained from a rather high priced, low sulphur, 2 in. by 3 in. nut coal from Southern Illinois, which is very hard and has a high B.t.u. value. Because of the hardness of this coal, there is little breakage during handling, and the fuel goes into the generator in a uniform size, with no fine stuff. The uniformity in size of the coal and coke gives an even distribution of fuel in the generator, with no trouble from blow holes or other fuel bed troubles. This fuel mixture is easily brought up to temperature during blasting and is not easily killed by the steam during the run; therefore, the quantity of make holds up throughout the entire run, and the generator is easily brought back to operating temperature during the blast. The clinker after fifty or sixty runs is thin, not over six to eight inches, and close to the grates, where it is easily removed, there being very little of the side wall clinker.

Use of a Softer Coal

Another Illinois coal which has practically the same analysis, but is much softer and obtained in the 3 in. by 4 in. size, gives fairly good results, but there is a great deal of waste due to breakage during handling. Therefore, when it is fired, it varies in size from small nut to 4 in., and even distribution of this fuel can not be obtained in the generator. The large pieces rolling to the outside leave the center full of fine stuff which the steam cannot penetrate, and gradually fuses into a large mass from which practically no blue gas is obtained.

The fusion of the center causes more steam to pass along the sides of the generator, cooling the larger pieces of fuel quickly so that the make drops off rapidly during the last half of the run. At the start of the blast the temperature comes back up rapidly, but is killed again during the next run. Due to the burning down of the fuel around the edge of the generator after from twenty to thirty runs, the center mass has to be broken apart and scattered before each firing. The clinker on this coal is thicker than the above, but if this center mass has been broken apart sufficiently the clinker is removed without much difficulty, provided the coal percentage is not over 65 per cent. On the hard coal a percentage of 80 or 85 per cent coal can be run without any great difficulty and good results obtained.

Clinkering Difficulties

The clinkering difficulties on a coal-coke fuel, if the up and down steam has been watched carefully, seem to be directly dependent upon the percentage of ash in the analysis of the coal; therefore, coal of less than 7 per cent ash is desirable.

The sulphur content of the coal should be less than 1 per cent, so as to obtain proper purification of the gas. With a coal-coke mixture the make per hour is increased, and so the rate at which the gas passes through the purification train will be increased. With a coal of 1 per cent sulphur, the hydrogen sulphide in the raw gas is 160 grains per 100 cu. ft., while with a coal of 2 per cent sulphur, the hydrogen sulphide will increase to 350 grains per 100 cu. ft.

Analyses of Gas Produced

The following gas analyses were obtained by taking a sample of the make gas from the hydraulic seal every 15 seconds during a run. A 65 per cent mixture of good coal was used, together with 32 gallons of oil per run, which gave a make per run of 11,000 cu. ft. of gas, with efficiencies of 32 lbs. of fuel and 2.9 gals. of oil per 1,000 cu. ft. of gas.

The hydrogen content was low on the air purge, increasing rapidly to 40 per cent as the steam was turned on, and then gradually to 46 per cent, and dropping back to a small figure on the last air purge.

The illuminants were low on the air purge, but jumped to 10 per cent at the start of the oil run, and increasing to 20 per cent at the end of it, dropping back to 2 per cent on the air purge.

The carbon monoxide content rises indirectly with the illuminants, decreasing as the illuminants increase, and increasing as the percentage of illuminants decreases. The monoxide is low on the air purge, increasing to 35 per cent with the steam run, and decreasing as the illuminants increase until 18 per cent is reached as the oil is turned off, the carbon monoxide increases again to 28 per cent and drops off to 2 per cent on the air purge.

The methane shows a percentage of from 9 to 11 during the steam run, with 2 or 3 per cent on the air purge.

The carbon dioxide, starting at 16 per cent on the air purge, drops to 2 per cent and then builds up through the entire run until 8 per cent is reached at the end of the steam run and 12 per cent at the end of the air purge.

(Continued on page 785)

The Better the Window Display the More Sales

A few suggestions on how to design the better display

Frank H. Williams

HERE'S an interesting test that the manager of the appliance department of any gas company can easily and quickly make:

For two weeks have an ordinary display in your show windows. Note how many people stop and look at the window the first week and note how the number of people stopping and looking at the window the second week drops off by a third or a half.

Then put in an exceedingly attractive and interesting display in the window for a week and at the end of that time replace it with another interesting and attractive display. The number of people stopping and looking at the displays the last two weeks will be three to four times as great as in the first two weeks.

Frequently Changed Window Displays Valuable

In other words, frequent changes of window displays and displays that are superlatively attractive are three to four times more valuable to the gas company in creating sales than displays which are not particularly attractive, though they are changed.

"We figure," said an enterprising middle western appliance department manager, "that our window displays are extremely important for not only this reason, that it gets the attention of people and helps that much in making sales, but also for these reasons:

Importance of Window Displays

"First. The public quite generally judges the character of the gas company by its window displays. If the displays are striking, interesting and snappy, and if they are changed frequently, then the public feels that the gas company s a live wire, an alert proposition, and that it is a good concern to patronize. But if the displays are lacking in punch and if they are never changed, then the public is pretty sure to feel that the gas company is asleep at the switch.

"Second. The gas company is paying a big rent for the show windows, or is charging up a big overhead to itself for the show windows if it owns the building in which it is located, and so it is only good business for the gas company to get as much as it can out of its windows.

"In view of all this, then, we go the limit all the time in making our window displays just as interesting and entertaining as possible and in getting as much business as we can out of the folks who stop and look at the displays."

And, undoubtedly, this is sound business talk for the managers of other appliance departments for gas companies.

How to Make Attractive Displays

But just how can the gas company always make its windows interesting and attractive and just how can it go about getting the utmost possible amount of business out of the people who stop and look at the displays?

In answer to this question here are some of the things that have been done along this line by various gas companies with considerable success:

Some Ideas

First—Put a table in front of the window, on which there is literature hooking up with the goods on display.

It was noticed that many people who stopped and looked at the show windows of a gas company simply went on after looking and did not come into the show room and ask questions or buy goods. So it was figured that it would be good business to try to do something which would make more of the folks come into the establishment.

The plan adopted in doing this was a simple one. The window dresser put a table near the window, at the entrance to the show room, and on this table he placed a lot of literature dealing with the articles on display. Then he put up a big placard on the table urging folks to "Take One."

Finally, in the show window he placed another placard on which there was reading matter stating that literature regarding the goods on display could be found on the table.

This stunt had the effect of making a large number of folks who were interested in the goods on display go to the table, pick up the literature and read it. It brought them farther toward the show room. Increased sales resulted.

The Ribbon Idea

Second—Has ribbons stretching from articles on display back into the show room.

A decidedly unique method of making the show windows function more successfully in selling goods was adopted by a western gas company appliance department manager.

This manager arranged some very attractive displays of heaters in the show window of his establish-

ment and then he attached a ribbon to each heater and stretched this ribbon to the interior of the establishment, where he attached it to a similar heater which was placed in operation. A sign in the show window then urged the onlookers to follow the ribbons into the show room and see the heaters actually in work.

This was such a novel stunt in local window displays that it made the folks sit up and take notice and made many of them not only look into the show room to see the heaters being demonstrated, but also made a lot of them actually go into the show room, where they asked questions and where a number of them made purchases.

Undoubtedly this stunt could be used with equally good results by other gas companies.

Photographs of Installations

Third—Having photos on display in the show windows of homes where the company has recently installed heaters.

A middle western appliance department manager who had found that the use of photos in his show windows always increased the amount of attention paid by folks to the windows, evolved a new method by using photos in the windows and of making them even more attractive.

This appliance department manager's plan was to take photographs of the homes in which appliances were installed by the company and then to put the photographs in the windows with little typed inscriptions attached to each one telling about the appliances installed and giving the locations of the homes.

Then the manager arranged groups of other pictures of homes in the show room where the company had installed appliances. Typed inscriptions were also used with these.

Large Placard Attracts Attention

And, finally, he used a big placard in each show window calling the attention of the public to the pictures and urging them to come into the show room and see the other pictures on display and notice whether or not the homes of any of their friends or relatives or acquaintances appeared on display. This big placard also stated that the people in attendance in the show room would be glad to give visitors any desired information as to the cost of the installations made in any of the homes and as to the results secured by the owners from their appliances, etc.

This display of photographs in the windows and in the show room attracted a lot of attenton and brought a lot more people into the show room than would otherwise have come. In fact, it was something like an exposition in its drawing power and the company profited accordingly in the sale of appliances.

It should always be remembered in connection with window displays that it is not enough simply to make people stop and look at them. The displays must go farther than this. They must make folks enter the store and buy goods.

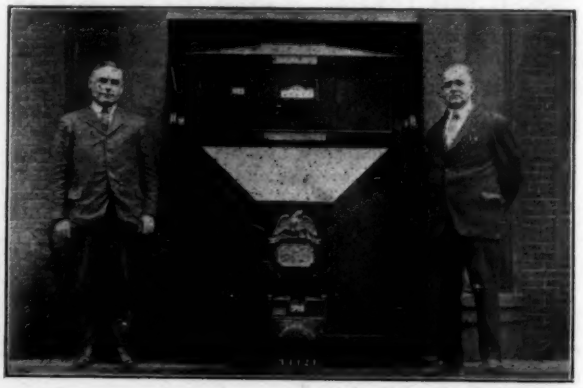
A MAMMOTH GAS METER

The meter destined for use in the singe room of the Lower Pacific mills is the largest gas meter ever sent into this section of the country. Its stupendous size has attracted great attention in the storehouse of the Lawrence Gas Company, where it awaits installation.

It would require the vocabulary of a circus announcer to properly describe this monstrous recorder of gas for the Pacific. Never in the long service of Superintendent William M. McQuestion, or Foreman Eugene A. Reardon has a meter even approaching in size this colossal product of the Tufts Meter Company been installed in this part of the state.

Some idea of the comparative size of this new gas meter can be obtained by noting in the picture above the ordinary house meter placed in the front center of picture and also by comparison with the height of the men at either side.

The capacity of the meter is given in Agent Fred H. Sargent's description: "This new gas meter that we will furnish the Pacific mills is six feet two inches high, four feet one inch wide and three feet four inches deep. It has a capacity of 7,500 cubic feet per hour or 125 cubic feet per minute. It is the largest gas meter we have ever had. It goes to our largest consumer—the Pacific mills. It cost as much as a good automobile. It is so accurately made and adjusted that it will record the amount of gas used by the smallest burner. Its installation at this time fittingly marks the 75th year of uninterrupted gas service in this city—a record of our company recognized throughout the gas industry."



INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 34

Expansion Effect of Heat (continued)

Use of Table

The above table may be used as follows: The weight of water per cubic foot is 62.4245 pounds per square foot at a temperature of 39.1 degrees F. If the water is being handled at a temperature of 203 degrees F, the weight per cubic foot is considerably less. The weight at this temperature is found by dividing the figure 62.4245 by the factor corresponding to 203 degrees in the above table. Thus the new weight per cubic foot will be 62.4245 ÷ 1.03943, or approximately 60 pounds per cubic foot. When the weight per cubic foot at a temperature not given in the above table is required, the factor must be found by interpolation.

Interpolation in the Table

Thus, if the weight per cubic foot at 100 degrees F. is required, it will be seen that this temperature lies between 95 and 104. The difference between the last two temperatures is 9, hence 100 is five-tenths removed from 95. The difference between the factors that correspond to the temperatures 95 and 104 is 0.00182. Five-ninths of this factor is 0.00101. The factor 100 degrees F. will then be 1.00586 (the factor for 95 degrees F.) plus 0.00101, or 1.00687.

The effect of the peculiar behavior of water as the temperature is lowered has already been explained above. It has a very important bearing on the different processes to which water is subjected in industrial apparatus. It is particularly important in the refrigeration of water to manufacture ice, for the freezing action of the ammonia or other refrigerant must be applied to the bottom of the ice cam until the temperature reaches the point of maximum density and then shifted to the top of the same in order to attain economy in the manufacturing process.

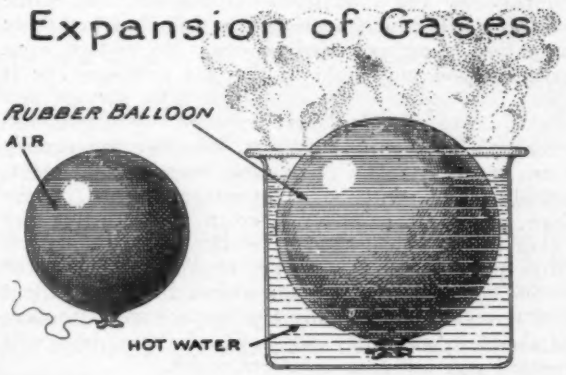
→ V

The Effect of Heat on Gases

The industrial gas engineer is primarily concerned with a substance that is made and used and always dealt with in the gaseous form. Therefore, in the study of the effect of heat which is known as expansion he is principally interested in this action of heat on gases, and in particular on gas as he knows it. The question is one of peculiar importance to him, for the simple reason that he handles a gaseous fuel, must measure the same to find out what quantity is being used, so as to be able to determine what efficiency is obtained with it. He must understand thoroughly the influence that heat has on gases and the importance always of specifying the temperature at which measurements of volume of gas are made.

Gases Expand More Than Solids or Liquids

Gases expand as the temperature rises. In this respect they behave in the same way as most solids and liquids. But the degree of expansion of gases is much greater than that of either solids or liquids. In liquids it has been noticed that the rate of expansion is greater than that of solids. The fact that it is greatest in gases is readily explained by the fact



Gas Expands When Heated

that the particles of a gas are not so close together, nor is the adherence between the particles so great, as in the case of solids and liquids. And in liquids the relation is the same in comparison with solids. The particles of a gas are able to move around with much greater freedom than is possible in the case of solids or liquids.

A simple experiment will show how quickly gases expand. Blow up an ordinary rubber balloon with air. Tie the opening fast so that no air will escape. Place the balloon in hot water. The temperature of the air within the balloon quickly rises and the pressure within the balloon rapidly expands its rubber walls. The temperature rise has caused a corresponding increase in the volume of the air.

HOW TO BE A SUCCESS IN THE GAS BUSINESS

(Continued from page 768)

"Are you looking at appearances, or trusting circumstances, instead of putting the blame on yourself?"

"Are you looking to others to put things right, to give you the right start, or are you so lacking in faith in your own abilities that you cannot even map out your own future course?"

If you cannot answer these questions satisfactorily, then success will not be yours. The man who looks at conditions in the wrong light, and blames circumstances for his refusal to put forth the best that is in him, will one day wake up to the fact that opportunity has passed him by. Then, when he is outside, he will learn, perhaps for the first time, that the supposed favored few have become masters of industry.

The Practical Test

Now, if the reader is anxious to get ahead in the gas industry, but wants to prove that what has here been stated is correct, then try the following experiment. If the instructions are faithfully followed you will learn the truth of my statements that most managers are on the lookout for loyal, efficient, courageous and industrious employees, and while you are still experimenting you will find favorable attention being extended to you. No matter what position you may hold in the gas company, be it office boy, junior clerk, complaint man, service and mains man, bookkeeper, cashier, stenographer, chemist, timekeeper, caretaker, salesman, emergency man, trencher, coke clerk, drip man, meter setter, telephone or switchboard operator, retort house man, machinist, engineer, fireman, inspector, or any other in the office, shop or works, you can, with a little patience and industry, improve your worth to the company and perhaps sooner than you expect find yourself commanding the respect and attention of those in authority who one of these days will reward you for your excellent work.

A Few Important Points

Here are a few of the points to keep in mind, and at every opportunity put them into practice:

Forget your own selfish interests and as far as is possible concentrate your attention to the interest of your employer. Make his business your own.

Forget you are working by the clock and always be on time, preferably ahead of time.

Try to do today's work better than you did your work yesterday.

Do not lengthen out your day's work in order to prevent more being given to you.

Be ever ready to be of service to those above and around you and, above all, to the industry itself.

Improve your knowledge of the business.

Learn all you can about the gas industry as a whole, even if it necessitates part of your evenings at home.

Learn to reduce your need of supervision, and salary increases will surely follow. One has said that a man's value is in direct proportion to the amount of supervision he requires. The less supervision the more value. The more supervision the less value.

Don't get faint-hearted when your fellow employee tells you that the boss doesn't appreciate your efforts in his behalf. There are thousands ready to tell you, "What's the use?" Hundreds ready to say that the game is not worth the candle. Dozens who will give advice that "You are only young once, Bill; have a good time now; there's plenty of time to think about your future." But, never mind. Some day you will be on top, and your ever-so-ready-to-advise friends will have wished they had started out as you had done, but it will be too late. Procrastination is the thief of time.

The gas industry today, more than ever before, needs men of ambition, men who are honest, keen, alert, optimistic and loyal. The future is very bright. More gas companies will soon be springing up all over the country and great will be the demand for men who are ready to take hold when that day comes.

As Samuel Smiles says, "Many are the valiant purposes formed, that are never done; designs projected, that are never begun; and all for want of a little courageous decision. Better for the silent tongue, but the eloquent deed. For in life and in business dispatch is better than discourse; and the shortest answer of all is 'DOING.'"

HAPPY'S HOME

An A. G. A. Booklet Helping the Sale of Water Heaters

This mailing piece is different from the regular direct-by-mail advertising literature in that the story we have to tell is presented in a series of pictures with suitable titles and captions with a human interest story which gets over the message of gas service. Photographs of these illustrations were taken especially for the association and have never been used before.

Space is provided on the back cover page for the imprint of the company name and address.

These booklets are offered at $25 per thousand, which price includes the imprint of name and address if made at the time the first run goes through the press.

As The Journal Views It

STREET LIGHTING WITH GAS

In the past, when the lighting business was considered one of the main sources of income in the gas industry, gas was as widely used for street lighting as electricity is today employed for the same purpose. With the decline in the use of gas for domestic lighting there was a corresponding decline in its application as a lighting medium for streets of cities and towns.

There is no gainsaying the fact that a large proportion of the street lighting business has been lost to the gas industry, but it must be brought to the attention of the gas men that there is still quite considerable business which gas companies enjoy in this field. It is good business, and it is business that the gas company can take care of with a minimum amount of expense and trouble, and it is big business, for the consumption of a street lamp is fairly large and requires a considerably larger amount of gas than many domestic appliances.

Therefore, it is very strange, indeed, to see gas companies paying so little attention to the street lighting load, while exerting every effort to obtain a new gas customer for a domestic appliance, which appliance consumes but a fraction of the amount of gas that is used by a street lamp. That such a condition should exist is hard to believe, but nevertheless it does, and it is rather difficult to discover the reason why the lucrative street lighting business should be neglected by the gas companies, where under certain conditions it is there for the asking, and has been since the days gas was generally used for lighting purposes.

Of course, there is no question but what it is a very difficult matter for the gas company to secure new lighting business; in fact, under ordinary conditions, it is almost impossible for it to do so. But there is no reason why the gas companies should allow the street lighting business which they now possess, and from which they derive a considerable income, to go by the boards. The psychology of the situation is something that is not obvious, but, nevertheless, the condition does exist.

That street lighting by gas is advantageous under certain conditions should be evident to every gas man. The trouble with him is that he only considers the advantages that electricity possesses as a lighting medium, which of course are very great, but forgets about the disadvantages which are present in every electrical distribution system. There have been many cases in which electricity has failed, and streets were entirely dark because of a break-down in the power house.

This could never happen with gas, for one of the main advantages of gas as a fuel or as a lighting medium is that it is absolutely dependable. There are but few cases on record where gas has failed, and then only under extraordinary conditions which could scarcely have been foreseen.

Therefore, it would seem advisable under the proper conditions to have a dual system of street lighting, electricity being used as a regular service and gas being available as the auxiliary system to fall back upon when electricity fails; and in the summer time, particularly in small towns where the electrical plant is not equipped with expensive apparatus, that is required to protect the generators against the sudden increase in the current due to electrical storms, shut-downs of the electric power plants are not at all unknown.

At any rate, even if the gas man does not see fit to advocate the dual system of street lighting, he should endeavor to keep whatever lighting business he has, for, as has been said before, it is lucrative business, and it is big business, certainly in comparison with the gas consumed by the average domestic appliance.

It is enlightening sometimes to read accounts of experiences in sections where electricity is produced by hydro-electrical mains. Certain parts of Southern California fall in this category, and recently reports from these sections have indicated that electricity has fallen down on the job badly and gas has been called in to do its work. For during the summer time the streams that feed reservoirs dry up and

there is lack of water, which in this case connotes a shut down of the hydraulic electric plant.

Thus the modern lighting medium, electricity, has to fall back on gas. It is just an illustration of the possibilities that are still present in the lighting business, and this pertains particularly to street lighting. The dangers that are always present when electricity fails and the streets are dark are evident to every citizen who has to walk the streets during such times. The duel system possesses great advantages, and it would be well for the gas companies to look into it. There are many reasons why communities would be glad to have it.

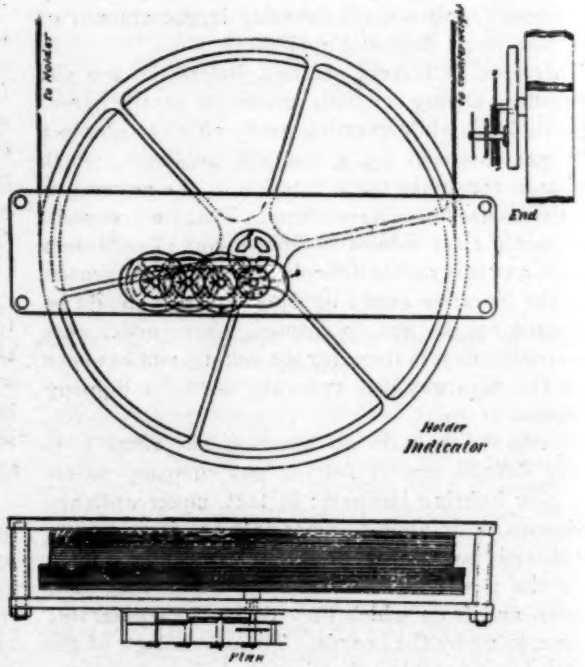
In a recent communication it was mentioned that the gas industry is threatened with an ultimate loss of 200,000 gas customers, consuming approximately 3,000,000,000 cubic feet of gas per year, which is, in round numbers, the amount of gas lighting business that is done by gas companies in the United States. A question was asked therein, which we may well quote: "Why spend hundreds of thousands of dollars to get new customers when a fraction of that expense would enable the industry to hold one great section of its business, furnishing 200,000 outlets for the use of gas, which is threatened with gradual extinction?"

GAS WRINKLES

Holder Indicator Showing Contents by Meter Dial

T. D. Miller

The device in the cut was prompted by a desire to read with reasonable exactness the amount of gas made at each run of a five-foot water-gas set. The relief holder is a two-lift of 110,000 feet capacity. The dial was taken from an old wet meter. The toothed wheel, B, which sets in the main shaft of the drum, has sixty teeth and actuates a six-tooth pinion on the shaft carrying the hand of the dial indicating 100 feet at each division. The perimeter of the main drum on which the cord winds in the spiral groove is equal to the vertical depth of the holder that will contain 10,000 cubic feet. When the holder cups, the perimeter of the drum must become less in proportion as the lower lift of the holder is larger in capacity than the upper. The transition from the larger to the smaller drum is accomplished by conic thread consuming over half a revolution of the drum, while the sketch shows it to have been accomplished in one-half revolution. As great accuracy is impossible in such a device, owing to the oscillations of the holder, the readings will be as accurate as is necessary for the uses to which it is put. The spiral drum is cast of white metal and mounted on a brass shaft. The cord used should be a soft brass cable. The counterweight can be suspended from a smaller drum on the main shaft so as to make the travel of the weight less, or it can be made to wind on the main drum and run beside the holder column. The dial is placed on the operating floor of the generator to be read after each run. Applied to storage holders, with dials set adjacent to station meters, and hourly readings being taken, the send-out can be calculated for any hour in the twenty-four.



Catechism of Central Station Gas Engineering in the United States

Installment No. 34

(Continued from last week)

Description of the Governor

When the bell is floating with a certain pressure in the street mains, it can be readily seen that as long as this pressure is furnished there will be no tendency on the part of the bell 6 to change its position; but if through an increased consumption on the main, the pressure in the main is reduced, the pressure in the pipe B and under the bell 6 will be reduced, and the bell will tend to fall, giving more opening to the valves, 8, in the valve chamber of the governor, and permitting more gas to pass. So far, the action of the automatic governor is like that of an ordinary governor. The automatic governor differs from the ordinary governor in that with this change in the position of the bell comes a change in the amount of weight balancing the gas pressure under the bell. This change is made by an ingenious contrivance, as shown in the cut. 3 is an annular ring containing mercury, and connected by means of the rubber tube 5 with another annular ring 2 which also contains mercury. But the ring 2 is rigidly attached to the valve-rod connected with the valves 8, and any increase in the weight of 2 tends to depress the bell and the valve-rod, giving more opening to the valve; whereas 3 is connected to the valve-rod by means of a chain or wire 9, passing over pulleys. Any increase in the weight of 3, therefore, tends to raise the valve-rod, the bell and the valves. If, now, there be a transfer of mercury through the tube 5, from the annular ring 2 to the annular ring 3, the annular ring 3 will tend to fall, raising the annular ring 2, and the valve-rod, bell and valve. If, on the contrary, there be a transfer of mercury from the annular ring 3 to the annular ring 2, there will be an addition of weight to the valve-rod, and it and the bell and the valves will tend to fall and the valves to open. The level of the mercury in 2 and 3 will remain always the same—this for the reason that 2 and 3 are connected by a rubber tube. When, then, the pressure has fallen in the street mains, and, therefore, under the bell, and the bell sinks, giving more opening to the valves 8, the ring 2 descends with the bell, the ring 3 is raised, because the wire or chain 9, passing over the pulleys, must follow the action of the ring 2, raising the ring 3 and causing some of the mercury to flow from it into the ring 2. We have, therefore, due to the reduction of pressure in the street mains, an increased opening on the valve, and an increase in the weight tending to hold the valve open, which means an increase of pressure. If, now, from the reduction in the consumption of the gas, the original pressure in the street mains is restored, there will be an increase in pressure under the bell 6, which will give it a tendency to rise. It will carry with it the ring 2, depressing the ring 3, and there will be a flow of mercury from the ring 2 into the ring 3. At the same time the valve will partly close and there will be a restoration of the conditions existing before the governor came into action.

The cup 1 is intended to receive weights used in adjusting the governor to the conditions under which it is to operate. These conditions once being established, and the governor being arranged to meet them, it requires no further attention, except to keep it clean and oiled. This governor can be so set that it will, for any given fall of pressure in the street mains, give a predetermined opening of the valves 8, and a predetermined pressure at the outlet of the governor, all within the limits permitted by the pressures thrown by the holders.

Adjustment of Governor

A feature of this governor is the provision made for its adjustment to meet the different conditions existing in works of the same size.

To illustrate this: We will take two works, each sending out 150,000 cu. ft. per day, the holder pressure being 30/10, and the maximum send-out being 25,000 cu. ft. per hour. For one of the works, say at "Gastown," the condition of the mains is such that a maximum pressure of only 20/10 is required, and a day pressure of 10/10 is sufficient.

For the other works, say at "Lightville," the condition of the mains and services is such that a day pressure of 18/10 and a maximum pressure of 28/10 is required; the margin of difference between holder and maximum pressure in this case being only 2/10 against a difference at the other works of 10/10. In each case the same volume of gas passes through the governor valve in the same space of time. In the case of "Gastown" the valve would be open about 1 inch, and of "Lightville" 3 inches, or more.

Adaption of Governor to Variable Conditions

To adapt the governor to meet such variable requirements and conditions, a series of three compartments or concentric vessels, 2, are arranged around and attached to the valve stem, each of a different capacity, and so arranged that by adjusting to use any one, or any two, or all three at once, a given quantity of mercury can be made to form a column of mercury of any one of seven different heights. This enables the superintendent to secure

a transfer of any desired quantity of mercury on any stroke of the valve.

The volume of mercury transferred for any given movement of the valve, valve stem and vessel 2 is increased by increasing the area of vessel 2. This vessel is so arranged that it may have any one of seven areas, as desired. The area to be used depends upon the conditions under which the governor must work.

Adjusting the Governor

In setting or adjusting the governor to meet the requirements of a works, the superintendent determines what pressure he desires at the lowest point of the district. He may desire to maintain at this point, say 1-inch pressure. He may find that to do this a day presusre of 15/10, and a night pressure of 25/10 must be maintained at the works; a difference of 10/10. Six ounces of mercury for each tenth (or 60 ounces) are put into ring 3. The governor is then weighted (in cup 1) to carry the day pressure of 15/10. When the consumption increases, the valves at once open, as above; this lowers vessel 2 and the mercury flows from 3 into 2, the result being to increase the weight on one side and diminish it on the other. Say the valve has opened in response to demand enough to transfer 6 ounces; this would equal placing 12 ounces on the valve stem, and the bell or float having this extra weight, the pressure is increased correspondingly. When the maximum volume is reached, all of the mercury is in vessel 2, and the full pressure of 25/10 is on.

Location of Gas Works

186. How should a gas works be situated with reference to the level of the district to be supplied?

Ans. "It may be taken as a rule that, other things being equal, the works should be situated below * * * the general level of the district supplied, as by that means advantage can be taken of the natural increase in the pressure of gas as it travels from the lower to the more elevated parts."—King's Treatise.

What Is Meant by Back Pressure

187. What does a gas man mean when he uses the term "back pressure?"

Ans. By "back pressure" is generally meant the total resistance offered to the passage of the gas from any point in the apparatus to its destination in the holder. For instance, the back pressure at the inlet of the purifiers would consist of the resistance of the purifiers plus the resistance of the station meter, plus the holder pressure, plus the friction in the pipes and connections. The term is also used to designate the resistance offered by any particular part of the apparaus. For instance, the difference in the pressure at the inlet and outlet of the purifiers would be spoken of as the "back pressure thrown by the purifiers."

Construction of Syphon Pressure Gauge

188. Explain the construction and use of the syphon pressure gauge.

Ans. "The syphon pressure gauge consists of a U-shaped glass tube, or of two vertical glass tubes cemented into a connecting tube at the bottom, and containing water to a point about midway of the height. When the water in each of the vertical tubes is exposed to atmospheric pressure the height of the water in each tube will be the same. In gas manufacture the syphon gauge is used to determine the difference between the pressure of the atmosphere and the pressure of the gas in any part of the apparatus or connecting pipes to which it may be attached. Connection is made between the apparatus, or pipe, and the top of one of the vertical tubes of the gauge. If the pressure in the apparatus is greater than that of the atmosphere, the water in the tube connected with the apparatus will be depressed—the water in the other rising until the difference in the heights represents the difference between the pressure in the apparatus and the pressure of the atmosphere. If the pressure in the apparatus is less than that of the atmosphere, the water will rise in the tube connected as above to the apparatus, being depressed in the tube open to the atmosphere, until the difference in the heights of the two columns of water represents the difference between the pressure in the apparatus and the pressure of the atmosphere. This difference is commonly expressed in inches and tenths of an inch."

The U Pressure Gauge and Its Use

189. What does the ordinary U or syphon pressure gauge indicate, and what is the object of its use in gas works?

Ans. The ordinary U or syphon pressure gauge shows the difference between the respective pressures acting on the surface of the liquid in each leg of the gauge. As used in a gas works it indicates the difference between the atmospheric pressure acting on the water in the leg open to the air, and the pressure of the gas acting on the water in the leg in communication with the interior of the pipe, or piece of apparatus, to which it is attached. Therefore, the pressure shown by the U gauge to be existing in any piece of apparatus is not absolute pressure, but merely the difference between the pressure in the apparatus and that of the outside air. This difference in pressure is expressed in terms of the height of the column of water that it will support. When the difference is positive. that is, when the pressure in the apparatus is greater than that of the air, it is called a "pressure." When the difference is negative, that is, when the pressure in the apparatus is less than that of the air, it is called "vacuum."

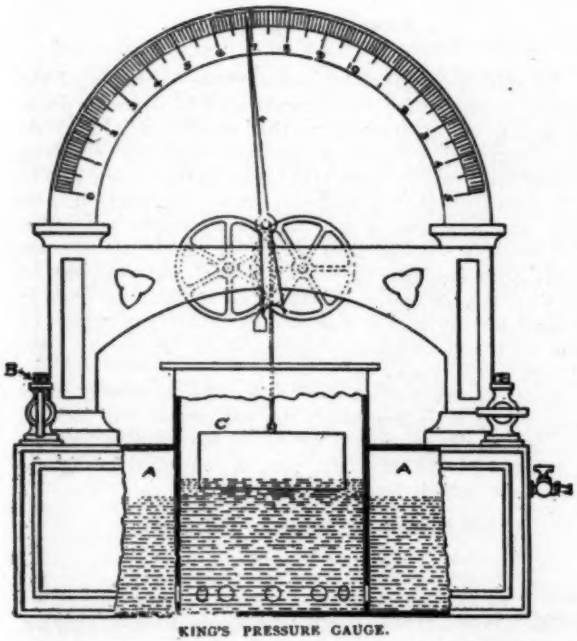
Object of Use of the Pressure Gauges

The main object of the use of pressure gauges in gas works is to furnish, at any and all times, information as to the amount of obstruction to the passage of the gas existing in each piece of apparatus as well as to the total amount offered by all of them combined. A proper distribution of pressure gauges among the various pieces of apparatus enables the operator to promptly detect and quickly locate any tendency to blocking up that might lead to serious trouble if it were not detected and corrected.

The King Pressure Gauge

190. Give a description, illustrated by sketches, of a "King's" pressure gauge.

Ans. A "King's" pressure gauge consists of a hollow box divided into concentric compartments, of



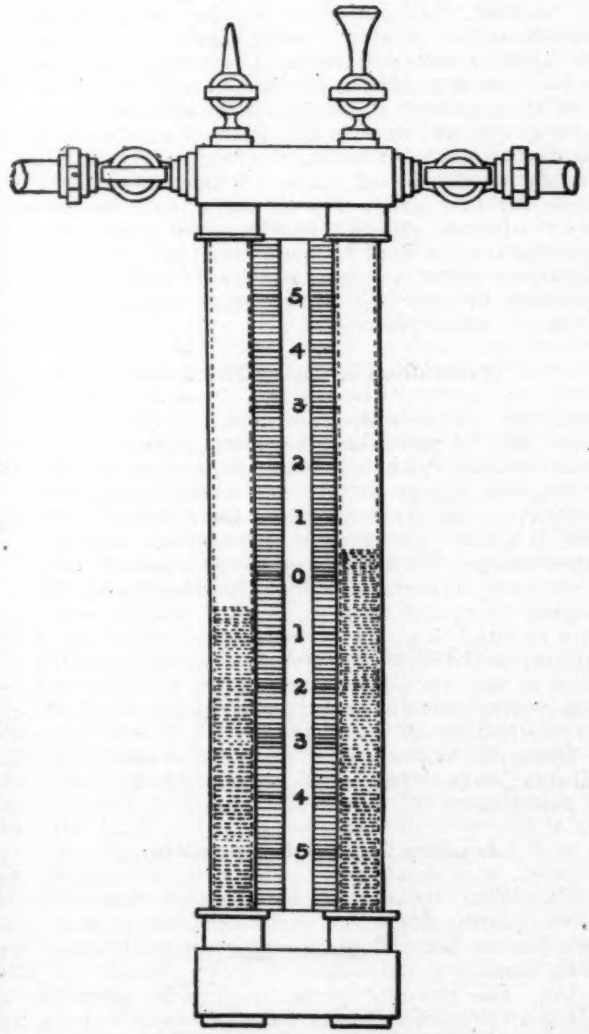
KING'S PRESSURE GAUGE.

which the larger, A, into which the gas is admitted through the inlet B, is closed to the atmosphere, and the smaller, C, is open to the air at the top and is in communication with A at the bottom. When both chambers are filled with water to a determined level and gas is admitted to A, the water in A is depressed and rises in C until the difference in levels is equal to the pressure of the gas on top of the water in A. A small metal float rises and falls with the surface of the water in C, and its motion is communicated by a cord and pulley wheel to the pointer P. This pointer moves through an arc of a circle and indicates the pressure on a graduated semi-circular scale. The travel of the pointer for any given motion of the float depends on the size of the pulley wheel. The proportions of the apparatus, and therefore the travel of the pointer over the scale for any given rise of water in the chamber C, may be arranged to give the instrument almost any degree of sensitiveness; that is, to indicate small variations in pressure, smaller variations than could be easily read on the ordinary syphon gauge. King's pressure gauge is the invention of Mr. King, late of the Liverpool Gas Company.

Differential Pressure Gauge

191. Describe a "differential pressure gauge," and explain its action.

Ans. "The differential pressure gauge differs from the ordinary syphon gauge only in its mode of attachment. The latter has one end open to the air, and serves to indicate the difference between the pressure of the gas and that of the atmosphere; while



DIFFERENTIAL PRESSURE GAUGE.

the differential gauge shows the difference in the gas pressures at two points. For instance, if one arm of the gauge is connected with the station meter inlet and the other with the outlet, the difference in the water levels will represent the difference in pressure at these points, or the loss of pressure in passing through the meter." (See cut.)

Significance of Abnormal Pressure Increase at Exhauster Outlet

192. What is indicated by an abnormal increase in the pressure at the outlet of the exhauster, and how would you proceed to determine the exact point at which the cause producing this increase in pressure is located?

Ans. An abnormal increase in the pressure at the outlet of the exhauster in a gas works indicates a partial blocking up of the gas way at some point in the pipes and apparatus lying between the exhauster and the holder. When any such increase of pressure is observed, the location of the obstruction should be determined at once in order that measures may be taken to insure its removal before it becomes great enough to interfere seriously with the operation of the works. If the plant is provided with pressure gauges on the inlet and outlet of each piece of apparatus, any obstruction of the gas way can be readily located by an inspection of these gauges, since the first gauge beyond the obstruction will show a normal pressure, and therefore it is certain that the trouble will be found in the piece of pipe or apparatus where the gauge at the inlet end shows an abnormal pressure and the gauge at the outlet end shows a normal pressure.

Precautions in Laying Fire Brick

If there is not a pressure gauge at each end of each piece of apparatus, the obstruction may perhaps be located by by-passing each piece in turn, noting the change in pressure in each case, until the piece of apparatus throwing the abnormal pressure is found. However, if the stoppage is in the pipes between the outlet of one by-pass and the inlet of the next, this method will not locate it, and in the absence of gauges fixed as above it will be necessary to attach a gauge at each end of each piece of apparatus and note the pressures existing, taking them in succession one after another, until the two consecutive points between which the abnormal difference in pressure occurs are found.

When this has been done the piece of pipe or apparatus that is at fault should be cleaned out as soon as possible.

Locating Cause of Pressure Rise

193. What are the precautions that should be taken in laying fire bricks and fire clay blocks to secure for the finished work strength and ability to resist heat?

Ans. The principal precautions to be taken in laying up fire bricks or fire clay blocks are that the bricks, or blocks, should be well wetted just before they are laid in place, and that each brick, or block, should be rubbed into place in such a way as to bring its faces almost into contact with the faces or the adjacent bricks, or blocks, in the wall, the joints being made as thin as it is possible to have them and at the same time have the fire clay fill all the interstices so as to give a uniform bearing over the whole surface. This is especially important in the case of arches, which should be laid as nearly as possible with the blocks face to face. Bricks and small blocks can be wet by dipping them into water in a bucket, kept filled and at hand for the purpose, each piece being dipped by the mason as he picks it up for the purpose of laying it in place in the wall. The surfaces of large blocks should be wet by having water sprinkled on them, a convenient method being to employ for the sprinkling a whisk broom which is wet by being dipped into the water into the bucket. The portion of the work previously laid, upon which the bricks, or blocks, are to be placed, should also be wet in the same way.

Securing Thin Joints

To secure thinness of joints, those surfaces of the blocks which come together should be smooth plane surfaces, being dressed to this condition if they do not originally possess it, and the fire clay must be mixed thin rather than stiff, care being taken not to get it so thin that it will run out of the joint, nor so stiff that any excess will not be squeezed out when the block is worked into place. If the joints are not made thin the fire clay will soften and run out of them when the work is subjected to heat, or even if it does not do this it will shrink under the action of the heat and cause a settlement of the upper part of the brick work.

Another precaution which should be observed is that when it is necessary to cut bricks, or blocks, the cut surfaces should never be exposed to the direct heat of the fire, the face so exposed being always one which has not been cut.

Testing Fire Brick

194. What tests would you apply to a fire brick to determine its quality?

Ans. The qualities desired in a fire brick are, infusibility, strength, regularity of shape, uniformity of composition and facility of cutting, and the tests to be applied to a fire brick should be such as will determine to what extent it possesses these qualities.

The degree of infusibility can be determined, to a certain extent, by an analysis of the material of which the brick is composed. If this analysis shows the presence of about 60 per cent of silica, less than 6 per cent of sesqui-oxide of iron and not more than 2 to 3 per cent as a total of lime, magnesia and the hydrates of potassium and sodium, the brick probably possesses a high degree of infusibility.

(Thirty-fifth Installment Next Week)

Some Aspects of House Heating*

Co-operation with architects and builders to construct model house

John B. Allington

AT THE meeting of the Commercial Section of this association at Briar Cliff Lodge, the writer pointed out some of the outstanding advantages of the application of gas to warm air heating systems. It was shown that these systems are not only more efficient than hot water or steam systems, but that they have more desirable load characteristics. As some of you will possibly remember, these systems were specially built furnaces containing a large amount of cast iron radiation and provided with heavy cast iron flue manifolds for draining off the condensate.

Results Obtained in Rochester

The installation of these furnaces in Rochester has proved successful and a careful study of the results obtained shows quite conclusively that the warm air heating systems are destined to become our most desirable field of endeavor. It is noticeable that the majority of houses in our state are heated with warm air furnaces. We have plotted curves of gas consumption and also of outside temperatures for each of our installations. We find that in the warm air systems that the gas consumption curve follows the outside temperature curve much more closely than either the steam or hot water installation. It is especially noticeable that in the warm air systems the gas consumption in the early fall is very low. This is a decided economy and we find that the total seasonal consumption of gas in a warm air system is approximately 15 per cent less than the seasonal consumption in a hot water or steam system.

Humidification of the Warm Air

In our endeavor to perfect the system as a whole it has been necessary to perfect it in every detail. With this as an aim we have made a careful study of humidification and have further developed the humidifier, which is now on the market in a finished form. A constant relative humidity of between 40 and 50 per cent is now automatically maintained in all of the houses heated with this furnace. This is obviously a difficult feat in a house heated with steam or hot water unless indirect radiation is employed. We have not been satisfied merely to sell a substitute for other fuels, but are now actively engaged in laboratory tests in an endeavor to perfect distribution systems. We hope in the near future not merely to sell gas for house heating, but to sell balmy summer atmosphere in the winter time. Such an achievement will, when properly demonstrated, sell our product much more easily and the price will not be so much of a consideration. To show a great improvement is possible, we studied conditions last month in Mr. Searle's home. Thermometers in his living room showed a temperature of 80 degrees at the ceiling, 72 degrees at the 5 ft. level and 65 degrees at the floor—a difference of 15 degrees between the ceiling and floor temperatures.

Uniform Temperatures Obtained

By simple means these conditions were so changed that no point in the room varied more than 2 deg. from 70 deg. The ceiling temperature was 72 deg., the floor temperature 68 deg. at the return registers, the relative humidity 53 per cent and the outdoor temperature 2 deg. F. An ideal condition of this kind is the greatest selling point for a gas-fired heating system.

In our studies of house heating costs it has occurred to the Rochester Gas & Electric Corporation that radical changes in home construction are possible, which, if carefully worked out, will reduce the heating cost to a very reasonable figure and at the same time add little, if any, to the actual building cost. Weather strips on all doors and windows are great heat savers and should be employed. Storm doors and windows are also heat savers, but expensive, requiring putting on and taking off each season and increasing the labor of cleaning. It may be better, therefore, to spend this money in properly insulating the walls and floors of the house. Such insulation is also justified because of its effect in keeping the house cooler in summer and also because of its sound-deadening qualities.

Care Required in Building

In the past forty years there has been a great evolution in home building in the northern section of the country. A man used to say to his neighbor, "I will build a larger house than yours," and then proceed to do so. The day of the large house and the 12 ft. ceiling is past and this evolution is progressing to the stage where waste space is to be entirely eliminated. The greatest evil today, however, is the tendency of our home builders to base their designs and room sizes and shapes almost entirely upon the economic use of lumber and material, with no thought whatever of heating requirements or heating comfort.

Let us take, for example, the home for the small family of moderate means. With gas as a heating

*Delivered at the annual meeting of the Empire State Gas and Electric Association.

medium and insulated floors, nearly all, if not all, of the cellar may possibly be omitted, thus saving in excavation and foundation costs. The living room, dining room, bath room and, to a lesser degree, the kitchen, are the only rooms which require heat at all times. Auxiliary heat may be supplied to the bath room in case of sickness or necessity. If all of these rooms are so designed and furnished that there is no waste space, even their size may be reduced. The cost of heating this house with an expensive fuel may then be very little, if any, more than heating the average house of the same livable floor space with coal.

Co-operation With Builders

The point is that it is possible to build homes with the idea of selling the service, and we should not stand idly by and watch the realtors build good-looking leaky houses just for a profit. The Rochester Gas and Electric Corporation has appropriated a substantial sum for an attempt to gain this objective.

We have recently advertised an architectural competition, open to local architects, with a first prize of $1,000 for the best plan and set of specifications for a modest home for a family of four people, the cost not to exceed $7,500, exclusive of lot and garage, and which shall best meet the construction requirements and room arrangements essential to the efficient use of gas and electric appliances and gas for heating. The house is to be designed to go on a lot 50 ft. wide. The bungalow type of house is suggested, having one large combined living room and dining room, a kitchen, two bed rooms, bath room, laundry and storage room. Other types will be given consideration as an analysis may prove some other type more suitable. The possibility of omitting the cellar, except a small one large enough to house a gas-fired warm air furnace will be given consideration. The cellar may be omitted altogether and the furnace placed on the first floor with air circulation induced by means of a fan. The living room is to be the one real room of the house and is to be of ample size. The ceiling height, however, is to be as low as possible to reduce the heating requirements to a minimum. Bed rooms are to be just large enough to house the bed and other furniture, leaving the necessary room for getting around.

The Design of the Kitchen

The kitchen is to be small, but to be so arranged as to minimize labor. It is suggested that recesses in the wall be provided for the gas range, refrigerator and kitchen cabinet. The possibility of using the kitchen as a laundry will be considered, the tubs in this case being provided with covers and used ordinarily as tables. The laundry is to be a small separate room or combined with the kitchen. A clothes dryer will be required for winter use, as there will be no space available for hanging up clothes. A storage room is to provide space for trunks, etc.; also space for the storage of vegetables, canned goods and fruits. This room must, of course, be cool in the winter.

Heat Loss Through Walls

The outside walls are to be constructed so as to reduce heat loss to a practical minimum. The use of coarse Sil-o-cel or other insulating material in the space between studding is suggested as a possibility. The use of a double layer of Celotex board or other similar materials is also possible. The floor and ceilings are both to be well insulated. Windows are to be provided with interlocking metal weather strips. The windows are to be double glazed, or storm windows may be provided. The roof is to be well insulated and provided with fireproof or fire-resisting coverings. A chimney may not be needed, but flues must be provided for the house heating furnace and other gas consuming devices.

Gas in Brick Firing

Harold F. Podhaski

While every one, of course, is thoroughly familiar with the many uses of gas for heating and lighting needs, for cooking and the like, an interesting illustration of its use in an industrial way was noted recently at Columbus, Ga., in the firing of brick at the large plant in that city of the Columbus Brick and Tile Company.

In this connection manufactured gas was virtually unheard of only a comparatively few years ago, but it is coming to be much more widely used for this purpose among the brick manufacturing plants of the South, the principal brick producing section of the country. The reason for this is to be found in its economy when all other methods are considered, and in its remarkable efficiency when used for this purpose. For instance, a few years ago the idea of heating thousands of brick at one time to an incandescent temperature, and maintaining this great heat for a period of, say, 80 to 100 hours, which is the usual time required, and doing so with a high grade fuel like gas was not only unheard of, but on the face of it virtually impossible. Yet experiments have proven it to be far better than the ordinary method, much less troublesome, more efficient and economic.

Gas is now being used exclusively by this company in the firing of its kilns and the burning of tile prod-

ucts, and with a degree of success that commends this same method as well worth the attention of all brick and tile manufacturers making burned clay products.

Larger Production and Better Quality of Brick

The Columbus company, for instance, has learned since using gas for this purpose that, in addition to an increase in the total production under the same manufacturing conditions as heretofore, they are also able to produce a much better quality of brick and tile than under the former method, to say nothing of other advantages accruing from its use. For example, one of these is the fact that the company is thus able to do away entirely with the purchasing and storing of large quantities of crude fuel, which, naturally, ties up a considerable sum of money, besides using valuable storage space.

Another interesting feature of this plant is the utilization of the heat after it has been used to burn the tile. This otherwise wasted heat, by means of an elaborate piping arrangement and blower fans, is forced over the fresh pressed brick and tiles, and dries them to a uniform hardness. Under the usual method this was not possible save at a considerable additional cost, which the use of gas serves to eliminate.

Celebrating an Anniversary

Helping to Sell Ranges by Giving Away Kitchen Utensils

A Blasted Utopia*

An experience in municipal ownership at Long Beach, Cal.

A FAIR test of municipal ownership of a gas company under the most favorable possible conditions, made in such a way that it offers direct and immediate comparison with private ownership, has just been made in the city of Long Beach, California. Exactly a year ago, August 14, the voters of Long Beach approved a bond issue for the purpose of acquiring the local distributing system from the Southern Counties Gas Company. The actual transfer took place on May 26 last. The city's experience since that time has been such as to furnish an illuminating object lesson of this subject.

The proposal to acquire the local gas system and operate it by and for the citizens of Long Beach must have been a tempting proposition. As is well known, Long Beach lies close to the famous Signal Hill oil and gas fields, containing almost unlimited supplies of natural gas. The principal cost of natural gas lies in distribution. An excellent distributing system had been installed here by the gas company, whose charges for domestic use ran, according to a carefully tabulated schedule, from 45 to 70 cents per thousand cubic feet.

It Appeared Simple

What could be more simple, theoretically, than for the city to buy this splendid, made-to-order system and distribute nature's bounty to the people for cooking, lighting and heating at a purely nominal cost? Certainly nobody can blame the voters for acceding to this suggestion with the greatest enthusiasm. The gas company was operating at a profit, which, under municipal ownership, would naturally be reflected in lower rates. The logic of the situation was inescapable.

The election campaign in which the bonds were approved reveals the hopes of the community and not a little of the methods of a certain familiar type of politician. One of the leading advocates of municipal ownership was Mr. Scott W. Alexander, chairman of the municipal gas committee.

"Why," he demanded, "when we have all the gas, why should we sell it to the Southern Counties Gas Company for 8 cents, and then buy it back from them for around one dollar? I believe that a municipally owned gas plant could operate so that gas could be sold for thirty cents per thousand cubic feet in this city. Furthermore, cheap gas would induce enterprises to come here, and few cities could compete with Long Beach, due to the fact that we have so much natural gas on Signal Hill."

A Familiar Editorial

The Live Wire, a Long Beach newspaper, came out about a week and a half before the election with the following familiar sounding editorial:

"There is no questioning the fact that the Southern Counties Gas Company is 'lining its pockets' off the people who are users of its product. Positive truth in the matter is given that the city could distribute gas to domestic consumers for 50 cents per thousand cubic feet and to industries using large quantities for 15 cents per thousand. Selling gas at those prices it is estimated that the net profit would be such that $4,000 per day would be turned into the city treasury.

"According to these figures, it is costing Long Beach $8,000 per day to permit the Southern Counties Gas Company to supply the gas needs of this city, which by public service could be saved to the city and its citizens and industries.

"The city better get into the gas business as soon as it can. No need to give further statistics."

According to the plan outlined by one of the councilmen, if the company refused to make what was considered a proper reduction in its rates, the city would either attempt to compel the gas company to sell its plant; or, failing that, the city would construct its own distributing system paralleling the mains of the gas company. The stockholders were assured of protection, for "the Long Beach system is but one of 23 municipal gas distributing systems owned by the company, and the assets of the company would protect stockholders in any event, in the case of the local system being acquired by the city!"

The Attempt to Force Rate Reduction

There is some evidence that at first the threat of municipal ownership was held over the company's head as a club to compel a reduction in rates.

"There is but one possibility for the prevention of the voting of the proposed $3,000,000 bond issue," declared the Long Beach Press, "and that is for the heads of the gas company to immediately apply to the railroad commission for a further and radical reduction of the schedule."

The Mr. Alexander quoted above offered on August 1 to bet $1,000 against $500, "if it were not unlawful," that the gas company would reduce its rates between then and election day.

Ten days before the election Mr. Alexander, who had assumed the leadership for the bonding proposal, made further prophecies of the tremendous saving which would be assured by putting the gas system into possession of the city.

"With our gas costing us nothing, we ought to be able to sell it to the people at from 20 to 23 cents per 1,000 cubic feet under municipal ownership," he said. "In addition to that, we should be able to furnish gas to the industries at 5, 10 or 15 cents."

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*From the American Gas Association.

COAL-COKE MIXTURE FOR GENERATOR FUEL

(Continued from page 770)

The oxygen content is constant throughout the entire run at from 0.6 to 1.0 per cent.

The nitrogen starts at 65 per cent at the beginning of the air purge, dropping to zero with the end of the purge, and remaining there until the last up run, increasing to 6 per cent at the beginning of the air purge and then rapidly increasing to 75 per cent at the end of it.

The Calorific Value of the Gas

The heat value starts at 120 B.t.u. on the air purge, increasing rapidly to 600, and then gradually to 840 on the oil run, dropping off rapidly at the end of the oil run to 400 on the steam purge, and then to 120 on the air purge. This gives an average heat value for the run of 580 B.t.u.

The volume of make during the run was largest at the start of the oil, gradually dropping off on the up run and remaining constant on the down run, and dropping off rapidly on the last up run until on the air purge it increases again.

The analysis of the above gas is as follows:

	Per Cent
Carbon dioxide	6.6
Illuminants	11.2
Oxygen	0.4
Carbon monoxide	22.1
Hydrogen	39.1
Methane	9.8
Nitrogen	10.8

The coal used on the above run showed the following analysis:

	Per Cent
Volatile matter	38.83
Fixed carbon	54.43
Ash	6.74
Sulphur	1.16
B.t.u.	13,137

A BLASTED UTOPIA

(Continued from page 784)

Under such optimistic auspices, the gas company bonds were put through at the election, and Long Beach was prepared, pending negotiations of sale, to offer industry "such an inducement as a town has never held out before," namely, heat, light and power at cost.

The Utopian Plan Comes to Naught

Exactly what happened to destroy this dream is not precisely known. No one would be so unkind as to intimate that the leaders of the people had deliberately misled them, or that any ulterior consideration had changed the decision of the authorities to cut existing rates at least in half. Nevertheless, the fact remains that rates were not substantially reduced after the city had taken control of the gas company's properties. Where the city's gas committee had assured the voters that gas could be distributed in Long Beach at a maximum rate of 50 cents, the authorities, less than a week after the transfer, ordered a flat rate for all domestic consumers of 60 cents.

This was the same rate which the gas company had charged for domestic consumers using more than 50,000 cubic feet, and only 10 cents lower than the company had charged for the first 15,000 cubic feet.

In certain classes the rates of the city were actually 15 cents higher than the rates of the company. A considerable number of Long Beach residents live in apartment houses where the gas bills are usually paid by the owner of the house. In cases where an accumulative annual guarantee of $500 was given the company for the entire house the old rate was only 45 cents per thousand cubic feet, and only 50 cents with a guarantee of $300. The city is charging 60 cents here as elsewhere.

"Such an inducement as a town has never held out before" to industry was realized by an actual increase in some schedules in the industrial rate and a conformance with the rates set by the gas company in nearly all others. In one schedule, where the minimum monthly charge by the gas company was only $8, city authorities found it advisable to charge $25.

The Present Situation

This is the situation as it stands at present. It might charitably be assumed that municipal ownership in Long Beach, instead of being beaten by practical experience, is only suffering growing pains. This conclusion, however, must be abandoned.

The city of Long Beach in its gas operations is facing two very serious difficulties, namely, the decline of Signal Hill, and unforeseen financial difficulties. When Signal Hill natural gas begins to decline the city will find itself up against the problem of a continued supply of gas, which will mean either the building of a new distributing system to bring in gas from the outside, or the construction of a manufactured gas plant and system which will render useless much of the city's present investment.

Meanwhile Long Beach has already expended all of its $3,000,000, the sum voted last August. It is said that the city is now embarrassed in meeting payrolls and particularly in being unable to finance betterments and extensions. Therefore, it appears that an additional bond issue must be asked of the voters in the near future.

"It Isn't Done"

Looking down Santa Monica Bay from its coign of vantage, The Times of Los Angeles points the moral of the last three months in an editorial entitled "It Isn't Done":

By reason of this vast reservoir of natural gas at the city's gates, Long Beach is in a position to have the cheapest light and heat of any city of its size in the country. But as soon as the people voted for municipal ownership and operation the members of the Council revised their ideas about the price of gas. They rejected the opinion of City Manager Windham that a 50-cent rate would be sufficient and proceeded to fix the price at 60 cents.

Current Market Prices

COALS (By Courtesy of Coal Age)

A. Bituminous.

(Spot prices, F. O. B., mines, net tons).

High Volatile, Eastern	Market	Price
Pool 54-64 (Gas Standard)	New York	$1.35 to $1.50
Pittsburgh screened gas	Pittsburgh	2.30 to 2.50
Pittsburgh gas, mine run	Pittsburgh	2.00 to 2.25
Kanawha lump	Columbus	2.00 to 2.25
Kanawha mine run	Columbus	1.30 to 1.55
West Virginia lump	Cincinnati	2.00 to 2.50
W. Virginia gas mine run	Cincinnati	1.35 to 1.60
Midwest		
Indiana 4th vein lump	Chicago	2.50 to 2.75
Indiana 4th vein mine run	Chicago	2.25 to 2.50
South and Southwest		
Big Seam lump	Birmingham	3.30 to 3.50
Big Seam mine run	Birmingham	1.50 to 2.00
Southeast Kentucky lump	Louisville	2.00 to 2.25
Southeast Kentucky mine run	Louisville	1.25 to 1.75

B. Anthracite.

(Spot prices F. O. B. mines, gross tons),

Market	Freight rates	Independent	Company
Egg New York	$2.34	$8.50 to $13.00	$8.00 to $8.35
Egg Philadelphia	2.39	9.25 to 11.00	8.10 to 8.35
Egg Chicago (net tons)	5.06	8.50 to 12.00	7.25 to 7.45

COKE (By Courtesy of Iron Trade Review).

Connellsville, furnace	$3.00
Wise County, furnace	$3.75 to 4.50
Alabama, furnace	4.50 to 5.00
Foundry, Newark, N. J., del	10.41
Foundry, Chicago, ovens	12.50
Foundry, Boston, delivered	12.00
Foundry, St. Louis	12.00
Foundry, Granite City, Ill	9.00
Foundry, Alabama	4.50 to 5.50

PETROLEUM (By Courtesy of Oil, Paint & Drug Reporter)

(Prices at wells, per bbl.)

Pennsylvania—Ohio—West Virginia.	
Cabell, West Virginia	1.45
Corning, Ohio	1.75
Lima	1.83
Pennsylvania	$2.75 to 3.00
Wooster, Ohio	1.65
Indiana—Illinois.	
Illinois	1.62
Indiana	1.63
Oklahoma—Kansas.	
Healdton	.90
Mid-continent (low gravity)	.90 to 1.05
Gulf Coast.	
Gulf Coast, Grade A	$1.35
Gulf Coast, Grade B	1.15

GAS OILS.

Gas Oil, Bayonne, bulk gal	5¼ to 6c
Gas Oil (32-36) Illinois-Indiana	4.86 to 5.11
Gas Oil (32-36) Oklahoma, gal	2⅝ to 2¾c
Gas Oil (32-36) Gulf Coast, gal	4½ to 5c

PIPE AND FITTINGS—CAST IRON GAS PIPE.

(By Courtesy Iron Trade Review.)

Four-inch, Chicago	$61.20 to $62.20
Six-inch and over, Chicago	57.20 to 59.20
Four-inch, Birmingham	56.00 to 59.00
Six-inch and over, Birmingham	52.00 to 53.00
Four-inch, New York	69.60 to 71.60
Six-inch and over, New York	64.60 to 65.60
Standard fittings, Birmingham, base	115.00

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20.

BY-PRODUCTS

(By Courtesy of Oil, Paint and Drug

Ammonia aqua, 16 deg. drums lb	5 to 5¼c
Ammonia aqua, 20 deg. drums lb	6¼ to 6½c
Ammonia aqua, 26 deg. drums lb	6½ to 7 c
Ammonia squa, anhydrous cylinder, lb	30 to 36 c
Ammonium sulphate, bulk F. O. B. Works, per 100 lbs	$2.40 to $2.55
Potash prussiate, yellow casks, lb	18½ to 19 c
Potash prussiate, red casks, lb	37½ to 40 c
Soda prussiate, yellow casks,	10 to 10½c
Soda sulphocyanide, barrels, lb	45 to 55 c

COAL TAR BASIC PRODUCTS.

(By Courtesy of Oil, Paint and Drug Reporter)

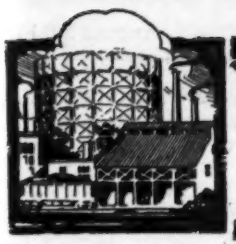
Benzol C. P. tanks, works, gal	24 to 25c
Benzol, drums, gal	30c
Benzol, 90% tanks, works, gal	23c
Benzol, 90% drums, gal	28c
Napthalene, flake, barrels, lb	5 to 5½c
Napthalene, dyestuff bags, lb	4½ to 5 c
Solvent Naphtha, water white works, gal.	24 to 25c
Solvent Naphtha, drums, works, gal	29 to 30c
Toluene, C. P. tanks, works, gal	31c
Toluene C. P. drums, works, gal	36c

Coal

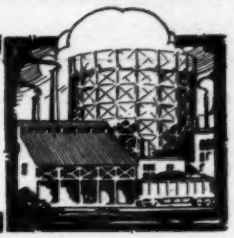
The production of bituminous coal for the week ending August 9 increased slightly, the output, according to the Geological Survey, totaling 7,800,000 net tons. The previous week showed an output of 7,484,000 tons, according to revised figures. Anthracite production decreased, being 1,683,000 net tons in the week ending August 9 and 1,720,000 tons in the previous week.

Crude Oil

The downward tendency of crude and refined oil prices appeared to have been checked somewhat last week. There was one general reduction in crude announced early in the week, taking in Gulf Coast grades, but the other fields were not affected. Refined petroleum products were still showing some easiness, but nothing further in the shape of a general downward readjustment was made.



NEWS OF THE GAS INDUSTRY



Gas Company's Business Increases

Bayonne, N. J.—An increase of 90,866 meters in service is reported by Public Service Electric Company, a subsidiary of Public Service Corporation of New Jersey, for the twelve months ending June 30, 1924. This is an addition of nearly 25 per cent, and brings the total number of meters in service up to 468,825. In the first six months of 1924, increase in meters amounted to 42,219, as against an increase of 33,650 for the same period of 1923.

A large, although not as large, increase is also shown by statistics of Public Service Gas Company, another of the corporation's subsidiaries. On June 30, 1924, it had 621,690 meters in service, an increase during the previous twelve months of 27,370. In the first six months of this year 11,950 meters were added, as against 9,878 in the corresponding period of 1923.

Gas Conditions in the Bronx, New York

Bronxites are becoming more honest and paying their bills with greater promptness, according to Louis H. Werner, vice-president of the Central Union Gas Company.

So honest are the gas company customers becoming that just as rapidly as possible the company is refunding the cash deposits which have been made to guarantee payment of bills.

"In the past six months we have advised 3,440 of our customers that they can get their deposits, and out of that number 2,244 have taken advantage of it. We have refunded $10,186," Mr. Werner said. "We much prefer, where a new customer can give a satisfactory commercial reference or refer us to some gas company from whom they have used gas, to accept the reference instead of a cash deposit.

"However, when a new customer is not able to give a satisfactory credit reference, a cash deposit is required. Old customers, who have established five years of satisfactory payment of bills, are now receiving their deposits," he said. "An interest rate of 6 per cent is paid on deposits and some patrons refuse to withdraw their deposits, pointing out that they are getting more interest on the money with the gas company than if it were deposited with a bank."

Although there are still thousands of the old quarter gas meters being used, the gas company official said that they are slowly passing out of demand.

"Most people who put in gas now do not want the quarter meters," Warner said. "The quarter meters were thought by patrons to result in economical use of gas, but the public has found out that it is all a matter of psychology. It makes no difference to the company which type of meter is used, because it has to keep both in repair."

Right now the use of gas is at its lowest ebb of the year, it was said, because of the fact that a large number of people take their vacations during July and August. In addition, in summer the use of gas for illumination is reduced to a minimum and a smaller quantity is used for cooking, as the people eat less hot food.

"However, we find that more hot water is used for bathing purposes in the summer than in the winter, and this evens up the situation a little," Werner said. "Most of the water is heated with gas water heaters. Another thing that lessens the demand for gas in the summer is that no gas is used for heating purposes at all."

Longer evenings in the summer result in more gas being used for lighting purposes, too, he said.

"I would not want to say that Bronxites are more honest than they have been in the past, but we find we have less trouble with bad debts when they are put on their honor than when prompt payment was forced through a cash deposit," Werner said. "Yes, I think most people are better satisfied when they work under an honor system. It has been very satisfactory to the gas company."

Probably no single item of operation has caused gas companies more criticism in the past than the fund derived from the cash deposits collected from patrons, Werner said.

"But that was because the public did not understand," he said. "Most people were under the impression that we used their money to extend our business at their expense.

"As a matter of fact, we have always paid the legal rate of 6 per cent interest, a higher rate than we would have to pay for loans on the money market."

Gas House Heating Campaign Planned for Spokane

Spokane, Wash.—The long contemplated move of the Spokane Falls Gas Company to introduce gas house heating equipment in Spokane has started with the arrival here of C. A. Gates from Denver, specialist on house heating for the Henry L. Doherty Company. Mr. Gates said:

"The first need will be to make a survey of the city for prospects. The Spokane company has already received about 250 inquiries. We are planning a publicity campaign and will have a complete plant set up at the company's offices and also later on in a home so those interested can see it in operation."

Mr. Gates said actual sales work could not start until the new rates applied for by the company go into effect. They are being contested by the city. If rejected a special low house-heating rate would be put into effect, he said.

He estimated that the heating rate would be 20 per cent under the cooking rate.

"We have been successful in introducing gas heating into Denver homes," he said. "After one year's campaign 500 plants had been installed and the prospect is that 1,200 will be in by the end of the

next heating season. The company was also successful in putting in the plants in the towns it serves all over Kansas.

"The Dover house-heating rate was $1 a thousand feet on the average. This is only approximate, because service was given on a three-part rate. It was found that the cost was about one and a half times the cost of coal, but less than the cost of oil. Considering the convenience of operation, steady heat and surety of supply, the difference is not prohibitive.

"The plants cost about as much as coal plants. They operate automatically. All that is necessary is to wind the thermostat clock, set it for the temperature you want and let it go.

"Coal plants will not be converted to use gas. That has been found unsatisfactory. New equipment will have to be installed. This has been invented by Doherty engineers collaborating with furnace manufacturers."

Courses on Public Utilities to Be Given in Temple University

A course on public utilities will be given in the School of Commerce of Temple University, starting this coming fall semester.

The courses on gas will include its many phases. The technical course covering gas utilities includes the tracing of the product from the raw materials through the manufacturing plant and through the distribution system to the consumer's appliances. The various types of coal gas equipment, carburetted water gas generating equipment and coke ovens are covered. Processes for the purification of gas and the recovery of by-products together with the value and application of these by-products are discussed. Methods of distribution, both high and low pressure, are described and problems in connection with the supply of gas are presented for discussion. The effect of large consumption upon equipment is discussed.

General Business and Economics of Utilities

The subjects considered are: The inter-dependence of the utilities and the communities; the difference between a public utility and an ordinary private corporation; the general plan of organization and the co-relation of departments; financing; commission regulation; service standards; effect of operating expenses upon revenue; sources of revenue; questions of value and valuations; rates and rate systems, etc.

This course is intended not only for utility men, but also for consumers of a utility's product.

I. Definitions and general discussion.

II. History and development.
1. Common Law Rights of Public in Property Devoted to Public Use.
2. Property affected with Public Interest.
3. Callings affected with Public Interest (a) Innkeepers; (b) Carriers; (c) Other callings.
4. Callings for which franchises are necessary.
5. Eminent Domain.
6. Licensing of Business.
7. Exclusive Rights under Franchises.
8. Regulation.
9. Rates and Rate-making.
10. Constitutional Provisions.
11. Statutory Regulations.

III. Interstate utilities.
1. Interstate Transportation.
2. Interstate Commerce Commission (a) Creation and Status; (b) Jurisdiction; (c) Authority, Powers and Functions; (d) Proceedings before Commission; (e) Regulation of Utilities by Commission.

IV. Pennsylvania Public Service Commission.
1. Constitutionality of Law Creating Commission.
2. Effect upon preceding laws.
3. Jurisdiction and Powers.
4. Public Utilities Affected (a) Railroads and Railways; (b) Other Carriers; (c) Telephone Companies; (d) Electric and Gas Companies; (e) Water and Power Companies; (f) Other Public Utilities.
5. Procedure before Commission.

V. Duties and liabilities of public service companies.
1. Service and Charges.
2. Tariffs and Schedules.
3. Contracts.
4. Reports and Information.
5. Accounts, Records, etc.
6. General Duties and Liabilities.

VI. Creation, powers and limitation of powers of public service companies.
1. Rights as to charges, dividends and profits.
2. Right to classify service patrons and rates.
3. Rules and Regulations.
4. Capitalization.
6. General Powers.

Medal Awarded for Accident Prevention

Recommendations for the awarding of the A. G. A. medal for heroism in the gas industry will be made at a meeting of the Accident Prevention Committee at association headquarters, 10 a. m., Friday, September 5.

The committee will also pass on names of gas company employees entitled to receive the McCarter medal, presented by T. N. McCarter, of the Public Service Gas and Electric Company of New Jersey. The recommendations of the committee must be approved by the executive board of the association before the final awards are made.

Final consideration of the annual report of the Accident Prevention Committee, to be presented at the A. G. A. convention, will be given at this, the last meeting of the committee before October.

Contracts Awarded

The U. G. I. Contracting Company, Philadelphia, has been awarded contract by the Northern Indiana Gas and Electric Company to furnish two new 6 ft. cone top generators for its Lafayette plant. This new apparatus will greatly improve the plant equipment at Lafayette.

The Consumers Power Company of Jackson, Mich., after careful investigation, has awarded contract to the U. G. I. Contracting Company, Philadelphia, for furnishing and installing a Model "B" U. G. I. automatic control on the 11 ft. carburetted water gas set, at its Flint, Mich., plant. According to the current news, this is the twelfth U. G. I. automatic control that is now on order to be installed in the state of Michigan.

Public Service Gas Co. to Merge

New Orleans, La.—The New Orleans Public Service, Inc., and the New Orleans Gas & Light Co. will merge at a session of the stockholders of the two companies called for September 9.

The contemplated action is but a formality carrying out provisions agreed upon in the reorganization scheme, Paul H. Maloney, commissioner of public utilities, stated. At that time the complete merger was impossible because all the outstanding stock could not be secured.

In the meantime the New Orleans Public Service, Inc., has held nearly all of the stock and has administered the company in every detail, at the same time buying in remaining outstanding stock. This now has been completed, so that complete absorption in the larger company may be perfected.

Merger of the gas company will leave only a few of the subsidiary yet to be taken over.

Contracts Awarded

In addition to the contract which it recently awarded the U. G. I. Contracting Co., Philadelphia, the Northern New York Utilities, Inc., has awarded to that company a further contract to dismantle water gas apparatus at Watertown, Mass., and to re-erect same with additions at the Rome, N. Y., plant, which has recently been acquired by the Northern New York Utilities, Inc.

Valparaiso Lighting Co. Changes Control

Valparaiso, Ind.—Purchase of the Valparaiso Lighting Company by public utility interests connected with the Calumet Gas and Electric Company, which has headquarters in Gary, was announced here recently.

The Valparaiso Lighting Company, which supplies both electric and gas service in this city, has been for a number of years a subsidiary of the Central Indiana Power Company, which is controlled by the American Public Utilities Company—the Kelsey-Brewer organization of Grand Rapids, Michigan.

The property will be operated under the direction of Charles W. Chase of Gary, vice-president of the Calumet Gas and Electric Company. Mr. Chase becomes president of the Valparaiso Lighting Company and John A. Norman of Gary, vice-president. R. J. Cory will continue as general manager of the local company.

The Valparaiso Lighting Company serves 2,790 electric customers and 1,860 gas customers. The average monthly output of electricity is 170,000 kilowatt hours. Gas sales average 3,500,500 cubic feet monthly.

Public Service of Colorado Continues to Grow

The Public Service Company of Colorado, formerly the Denver Gas and Electric Company, has called a meeting of the stockholders for September 3, 1924, at 9:30 a. m., at the Gas and Electric building, Denver, for the purpose of voting on the merging of the Public Service Company and the Colorado Power Company, the Colorado Power Company being the owners of the largest hydro-electrical plants within the state. The merger is assured because the Public Service Company owns the majority of the stock.

Coast Utility Changes Hands

H. M. Byllesby & Co. purchased the capital stock of the Sierra and San Francisco Power Company of California from the California Railway and Power Company. The property consists of water power plants of 60,000 horsepower on the Stanislaus River, in Tuolumne county, California; a steam turbine power plant of 36,000 horsepower in San Francisco and a high tension transmission line 850 miles long. At present the Pacific Gas and Electric Company is operating it under lease and it is physically connected with the Western States Gas and Electric Company near Stockton and the Coast Valleys Gas and Electric Company in the Salinas Valley. Byllesby owns the two latter concerns. The Market Street Railway of San Francisco gets its power from the Salinas Valley plant.

Approval Asked for Gas Franchise

Albany, N. Y.—The Adirondack Power and Light Corporation of Schenectady has petitioned the Public Service Commission for approval of a franchise granted by the town board of Colonie, August 4, permitting the company to lay a gas main through the town. The petition states that the company has entered into a contract with the Troy Coke and Iron Corporation for the purchase of gas, and in order that it may transmit the gas from Troy it is necessary to lay a main through the city of Watervliet and the towns of Colonie and Rotterdam.

Gas Co. Increases Capital Stock

Albany, N. Y.—Certificate has been filed in the office of the Secretary of State at Albany, through Hinman, Howard & Kattell, attorneys, Binghamton, N. Y., increasing the number of shares and issue of common stock non par value of the Binghamton Gas Works from 7,500 shares of $100 par value to 32,500 shares, of which 10,000 shall be preferred stock, $100 par value, and 22,500 shall be common stock, non par value.

Tri-City Gas Co. Applies for Industrial Rates

The industrial gas rate asked for is as follows:

$1.60 per 1,000 for the first 10,000 cu. ft.

$1.10 per 1,000 for all over 10,000 cu. ft.

Minimum charge of $15 per month, for which payment the consumer can use any part of 10,000 cu. ft. per month, with a discount of 10 cents per thousand cu. ft. for prompt payment. This rate to be optional with the consumer in lieu of the present above set out.

Cities Service Makes a Scoop in Ohio

Cities Service has taken over the Sandusky Gas and Electric Company, the Northwestern Ohio Railway and Power Company and the Port Clinton Electric Light and Power Company. The acquisition of these concerns will form a strong link between the Toledo Edison and the Ohio Public Service Company, subsidiaries of the Cities Service.

Associated Gas Extra Dividend

New York—The Associated Gas and Electric Company, in a letter to stockholders, mailed recently, announced the declaration of an extra dividend of 50 cents a share based on the current year's earnings, and payable in four installments of 12½ cents a share, beginning with the payment for the first quarter of next year, due April 1, 1925. The extra dividend amounts to 1 per cent on the stated capital of $50 a share, making the total annual dividend to stockholders 8 per cent for the current year. Early this year a similar extra payment was authorized out of the earnings for 1923 and has been paid.

The company reviews to its stockholders the progress in carrying out its program of construction and acquisition of properties in New York State, begun last year, and now largely completed so far as the present system is concerned. It points out that further negotiations are under way for the extension of transmission lines of the New York State Gas and Electric Company, the operating company, so that they may be utilized for the transmission of wholesale power in the territory of the state not now occupied by it, "which will immediately reduce line losses and to some extent produce lower power costs through reduction in transmission expenses."

In addition to acquiring New York properties, the Associated Gas and Electric recently took over eleven municipally owned plants in Tennessee, which will be expanded and connected by transmission lines. The Kentucky-Tennessee Light and Power Company was organized to acquire these properties for the parent company and has been consolidated with the former Kentucky Public Service Company as the Kentucky-Tennessee Light and Power Company.

The letter points out that company executives devoted about eighteen months to the Staten Island Edison situation, with the result that the corporation is now paying dividends at the rate of $3 per share, which is at the rate of 6 per cent a year on the $50 capital stock, with earnings of more than 10 per cent. The electrification of the Staten Island Rapid Transit Railway Company's lines is now in progress under a long-term contract with the Staten Island Edison Corporation.

Will Blend Gas in Erie

Erie, Pa.—The Pennsylvania Gas Company has made known its plan to blend artificial with natural gas so that the city of Erie will be assured of an adequate supply of gas. It will ask a rate of 85 cents a thousand for the blended product, 10 cents more than the present rate of 75 cents. The natural gas rate was recently advanced here from 50 to 75 cents a thousand. The city of Erie now has a protest before the Public Service Commission against the 75-cent rate.

Big Coke Plant for Troy, N. Y.

Troy, N. Y.—A contract has been signed by the Hudson Valley Coke and Products Corporation and the Foundation Company of New York for the construction in Troy of a by-product coke plant, which will be the basis of a new gas distribution system in the Capital District.

The construction cost is estimated at $2,500,000, and the plant will include an auxiliary water gas plant for the supply of six Hudson Valley cities: Albany, Troy, Schenectady, Cohoes, Rensselaer and Watervliet.

The Hudson Valley Coke and Products Corporation is a joint undertaking of the Burden Iron Company, the Oliver & Snyder Steel Company, the Arthur Tutein Company and others for the construction in Troy of a by-product coke plant.

Workmen are already engaged in testing the proposed site of the coke plant to determine the nature of the ground on which it is to stand. Before building operations can be started the land will have to be leveled and filled in to some extent. It is expected that the plant will be completed in about a year, because the Hudson Valley Coke and Products Corporation is under contract to the Troy Gas Company, the Municipal Gas Company of Albany and the Adirondack Power and Light Corporation to furnish gas by September, 1925.

Although both the Municipal Gas Company of Albany and the Adirondack Light and Power Company of Schenectady have received permission from the Federal War Department to lay pipe lines beneath the Hudson River from the west shore to the plant of the Hudson Valley Coke Products Corporation, which will be built in the South End, neither of these concerns has started work on the lines.

It is expected that each will begin at both ends and work toward a central point. The lines will probably lie side by side beneath the river bed and diverge at the west shore, the Albany line turning south and the Schenectady line continuing in a westerly direction.

The mains which will cross the river will be laid five feet below the bed of the river, dredges being utilized for digging a trench to that depth. Divers will lay the pipe and make water-tight the joints beneath the surface, and the whole work will be rushed so as to not interfere with river traffic any longer than necessary.

Date of N. J. Gas Association Meeting Postponed

The following notice has been issued to members of the above association:

"To all members of New Jersey Gas Association:

"September 12th has been adopted by the President of the United States as Defense Day.

"On this day in every community there will be patriotic meetings and services. Many of our members are affiliated with the American Legion and other patriotic associations.

"Therefore it has been decided to postpone our mid-summer meeting to September 19, 1924, at Ocean City Yacht Club, Ocean City, N. J."